

Replacement Claims

7. A method of removing particulate debris from a vessel using a catheter assembly the method comprising:

inserting and advancing a sheath having a discharge lumen to a location in the vessel said delivery sheath discharge lumen coupled to a collection vessel, said sheath not having an occlusion balloon thereon such that said sheath partially blocks the vessel but allowing some blood flow in the vessel;

inserting and advancing an interventional device to a treatment location, said interventional device of type having;

an angioplasty therapy balloon for delivering angioplasty treatment;

a gap for introducing a primary fluid flow in said vessel, said gap located distal of said therapy balloon;

injecting fluid out of said gap to promote retrograde flow into said discharge lumen.

8. The method of claim 18 wherein said moving step begins near said occlusion and ends after the interventional device enters the delivery sheath.

9. The method of claim 7 wherein said fluid is injected at a first injection pressure above the blood pressure in the vessel and expands to a second exhaust pressure in said delivery catheter where said exhaust pressure is above said blood pressure, establishing a pressure gradient in said discharge lumen and promoting flow from said gap to said discharge lumen.

18. The method of claim 7 wherein said injection is carried out while moving said interventional device in said vessel with respect to said delivery sheath.

19. The method of claim 7 wherein said discharge lumen is coupled to a syringe collection chamber.

20. The method of claim 7 wherein said discharge lumen is coupled to a syringe vacuum chamber.

21. The method of claim 7 wherein said primary fluid is supplied by a supply syringe chamber.
22. The method of claim 21 wherein the fluid supplied is a thrombolytic.
23. The method of claim 21 wherein the fluid supplied is saline.
24. The method of claim 21 wherein the fluid supplied is contrast agent.
27. The method of claim 7 wherein said primary fluid is supplied by a supply syringe chamber and said discharge lumen is coupled to a syringe vacuum chamber, and said supply syringe and vacuum syringe are operated together to couple fluid supply with discharge lumen collection.
28. A method of removing particulate debris from a vessel using a catheter assembly the method comprising:
 - inserting and advancing a sheath having a discharge lumen to a location in the vessel said delivery sheath discharge lumen coupled to a collection vessel; said sheath not having an occlusion balloon thereon such that said sheath partially blocks the vessel but allowing some blood flow in the vessel;
 - inserting and advancing an interventional device to a treatment location, said interventional device of type having;
 - a stent deployment therapy balloon for delivering stent treatment;
 - a gap for introducing a primary fluid flow in said vessel, said gap located distal of said therapy balloon;
 - injecting fluid out of said gap to promote retrograde flow into said discharge lumen.
30. The method of claim 7 further including a suction applied to said sheath lumen to withdraw material form said vessel.

31. The method of claim 29 further including a suction applied to said sheath lumen to withdraw material from said vessel.